Volunteer Lake Assessment Program Individual Lake Reports

SUNCOOK POND, UPPER, BARNSTEAD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	32,063	**Max. Depth (m):**	13.1	**Flushing Rate (yr^{-1}):**	7.5
Surface Area (Ac.):	347	**Mean Depth (m):**	5.6	**P Retention Coef:**	0.38
Shore Length (m):	6,400	**Volume (m^3):**	7,895,000	**Elevation (ft):**	551

TROPHIC CLASSIFICATION

Year	Trophic class
1979	MESOTROPHIC
1992	OLIGOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

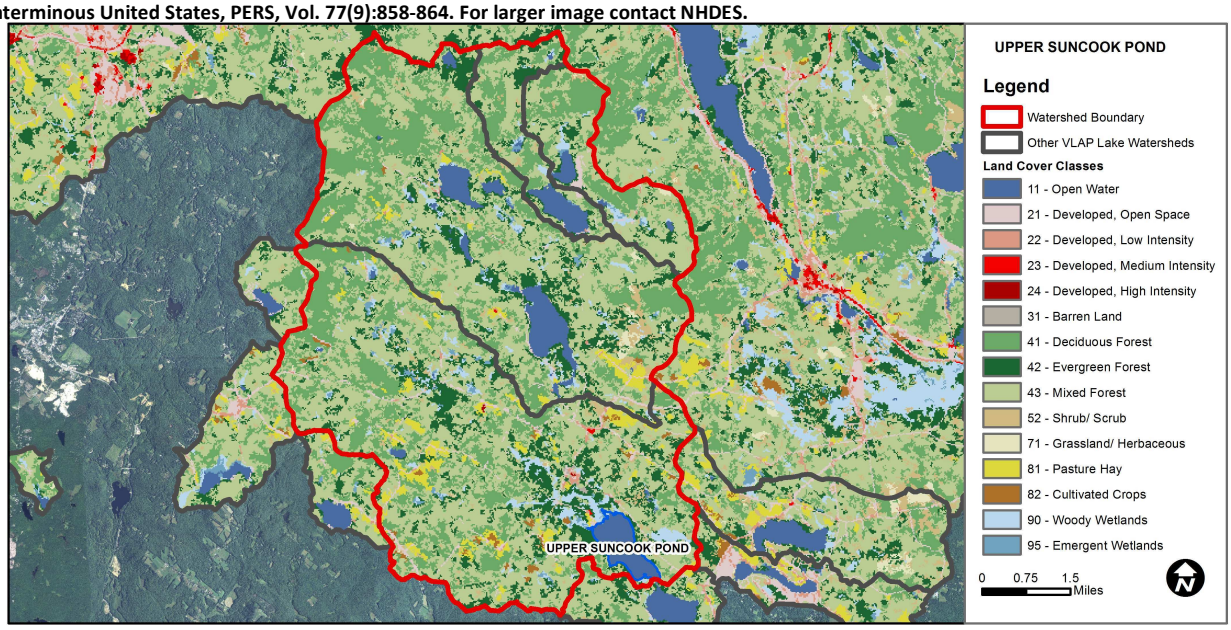
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	<5 samples and median is > threshold. More data needed.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Cautionary	< 10 samples and 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	No Data	No Data for this parameter.
	Chlorophyll-a	Encouraging	< 10 samples and no exceedance of criteria. More data needed.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

UPPER SUNCOOK LAKE - TOWN BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
UPPER SUNCOOK LAKE - CAMP FATIMA BEACH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	4.6	Barren Land	0.05	Grassland/Herbaceous	0.39
Developed-Open Space	1.89	Deciduous Forest	25.08	Pasture Hay	2.92
Developed-Low Intensity	0.27	Evergreen Forest	13	Cultivated Crops	0.47
Developed-Medium Intensity	0.03	Mixed Forest	45.16	Woody Wetlands	2.91
Developed-High Intensity	0.02	Shrub-Scrub	2.49	Emergent Wetlands	0.7

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
SUNCOOK POND, UPPER, BARNSTEAD, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels were low and less than the state median. Historical trend analysis indicates relatively stable chlorophyll with moderate variability since 2003.
- **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity and chloride were relatively low and approximately equal to the state medians. Historical trend analysis indicates stable epilimnetic conductivity with low variability since 2003.
- **TOTAL PHOSPHORUS:** Epilimnetic (upper water layer) and metalimnetic (middle water layer) phosphorus levels were low and less than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability since 2003. Hypolimnetic (lower water layer) phosphorus levels were elevated and likely the result of internal phosphorus loading. When hypolimnetic dissolved oxygen levels deplete below 1.0 mg/L, phosphorus typically bound in the sediment may be released into the water column. Camp Fatima Inlet phosphorus levels were slightly elevated in September and turbidity was also slightly elevated indicating sediment and/or organic matter may have contributed to elevated phosphorus.
- **TRANSPARENCY:** Transparency was average and approximately equal to the state median. Historical trend analysis indicates relatively stable transparency with high variability since 2003.
- **TURBIDITY:** Hypolimnetic turbidity was elevated and likely the result of the accumulation of organic compounds released from bottom sediments under anoxic conditions (no oxygen). Camp Fatima Inlet turbidity was slightly elevated.
- **PH:** Metalimnetic and hypolimnetic pH levels were less than desirable range 6.5 – 8.0 units. Historical trend analysis indicates relatively stable epilimentic pH with high variability since 2003.
- **RECOMMENDED ACTIONS:** Increase monitoring frequency to three times per summer, typically June, July and August, to better assess seasonal and historical trends and reduce data variability.

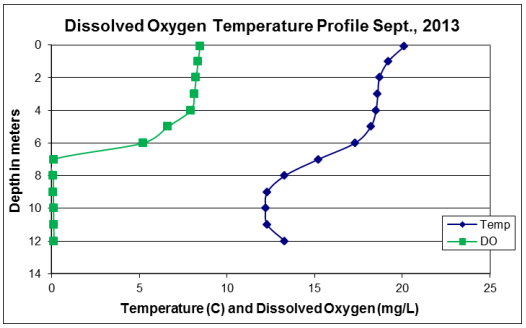


Table 1. 2013 Average Water QualityData for UPPER SUNCOOK POND

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m NVS	Trans. m VS	Turb. ntu	pH
Camp Fatima Inlet			7	60.9	18			2.24	6.49
Camp Fatima U/S				43.8	9			0.87	6.57
Epilimnion	5.90	3.68	5	43.3	9	3.30	3.70	0.93	6.54
Metalimnion				44.5	9			1.23	6.36
Hypolimnion				55.3	27			12.45	6.14
Public Bch Inlet			5	43.7	8			0.90	6.56
Suncook R Inlet			5	45.2	10			0.84	6.42

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
Conductivity	Stable	Trend not significant; data show low variability.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.